

**WHAT IS CLAIMED IS:**

1. A mobile communication system employing a plurality of digital optical links, comprising:

5 a base station controller for managing overall control within said mobile system, said BS controller coupled to a base transceiver system (BTS) via a first E1/T1 link;

a base transceiver system (BTS) controller coupled to said BS controller via a second E1/T1 link for managing the channel capacity of a plurality of compact base transceiver systems (BTSSs);

10 a plurality of optical fiber links coupled to said BTS controller at one end via an optical coupling and the plurality of said compact BTSSs at the other end;

said plurality of compact base transceiver systems (BTSSs) having a plurality of optical transponders arranged in space relation with each other along each of said optical fiber links; said optical transponders being operative for receiving an up-link signal at one  
15 frequency to be retransmitted as a down-link signal and for amplifying said up-link signal at another frequency to other compact BTS along said optical fiber link.

2. The system of Claim 1, wherein said down-link signal corresponds to the radio frequency(RF) of said compact BTS, and wherein said amplified up-link signal is  
20 forwarded to the RF portion of said other compact BTS disposed along said optical fiber link.

3. The system of Claim 1, wherein said compact BTS controller comprises:  
a link control section for dividing incoming signals received from said BS controller  
according to a link, a frequency assignment and a sector information extracted from said  
incoming signal, and for transferring said divided signals to the plurality of said optical fiber  
links;

5 a link device for matching signals exchanged between one of said compact BTS and a  
mobile station in communication with said one compact BTS;

10 a conversion section coupled to said link device for converting a forward  
IF(intermediate frequency) signal into a digital signal and for converting a reverse IF signal  
into an analog signal;

15 a multiplexing section coupled to said conversion sector for multiplexing said forward  
digital signals into a plurality of channels and for demultiplexing signals from one of said  
optical fiber links to be transferred to said link control section.

15 4. The system of Claim 3, further comprising an optical converting section  
coupled between said multiplexing section and one of said optical fiber links for converting  
from/to an electrical signal to/from an optical signal.

20 5. The system of Claim 4, wherein said optical converting section further  
comprising a coupler for transmitting said converted optical signals at a particular frequency  
to one of said optical fiber links, and for transmitting optical signals received from one of  
said optical fiber links to said optical converting section.

6. The system of Claim 1, wherein the number of said optical fiber links is limited by the capacity of said BS controller.

7. The system of Claim 1, wherein said optical transponder comprises;

5 a first optic coupler for dividing forward optical signals inputted from a previous optical transponder according to wavelength received therein;

a first photoelectric converter for photoelectrically converting said forward optical signals divided by said first optical coupler;

a high frequency divider for dividing electric signals photoelectrically converted by

10 said first photoelectric converter into a first signal and a second signal;

a demultiplexer for demultiplexing said first signal and for outputting said demultiplexed first signal to the RF portion of the current compact BTS;

a first electro-optical converter for electro-optically converting said second signal; and,

15 a second optical coupler for dividing said converted second signal according to the wavelength received therein and forwarding said converted second signal to a next optical transponder.

8. The system of Claim 7, further comprising:

20 a second photoelectric converter for photoelectrically converting the signals received from said second optical coupler;

a multiplexer for multiplexing the electric signals received from said second

photoelectric converter; and,

a second electro-optical converter for electro-optically converting said multiplexed electric signals and for forwarding said converted signals to said previous transponder via said first optical coupler.

THE GOVERNMENT OF THE CANADIAN NATION